

# A review of wildlife ecotourism in Manaus, Brazil

Neil D'Cruze<sup>1</sup>, Fernando Carniel Machado<sup>1</sup>, Neil Matthews<sup>1</sup>, Margaret Balaskas<sup>2</sup>,  
Gemma Carder<sup>1</sup>, Vanessa Richardson<sup>3</sup>, Roberto Vieto<sup>1</sup>

**1** *World Animal Protection, London, United Kingdom* **2** *BirdLife International, Cambridge, United Kingdom*  
**3** *Centre for Ecology, Evolution and Conservation, School of Environmental Sciences, University of East Anglia, Norwich, United Kingdom*

Corresponding author: Neil D'Cruze ([neildcruze@worldanimalprotection.org](mailto:neildcruze@worldanimalprotection.org))

---

Academic editor: W. Magnusson | Received 21 July 2017 | Accepted 28 September 2017 | Published 3 October 2017

---

<http://zoobank.org/A2061DFF-692D-4D32-A167-24631CCF7243>

---

**Citation:** D'Cruze N, Machado FC, Matthews N, Balaskas M, Carder G, Richardson V, Vieto R (2017) A review of wildlife ecotourism in Manaus, Brazil. *Nature Conservation* 22: 1–16. <https://doi.org/10.3897/natureconservation.22.17369>

---

## Abstract

The Amazon's ability to draw tourists is thought to be strongly associated with the opportunity to have sight of and interact with iconic wild animals. Tourism leaders are calling for the private and public sectors to develop wildlife focused ecotourism in this region. However, specific information regarding current practice and their impact on wildlife is lacking. Although wildlife ecotourism here remains in its relative infancy, our study demonstrates that a wide variety of wildlife-focused activities are already being promoted and provided to tourists who visit the city of Manaus in Brazil. Issues of potential wildlife conservation and animal welfare concern include wildlife-baiting, swim-with free-ranging pink river dolphin activity, the use of captive wild animals as photo props and the sale of wildlife body parts as souvenirs. We found that tour guides actively promoted these activities on 77% of excursions attended, which involved a range of different wild animals, representing at least 10 different species from three different taxonomic classes. From a legal perspective, despite the potential risks imposed to wildlife and tourist well-being, there are still no specific laws regulating feeding, touching and swimming with pink river dolphins in Brazil. However, the illegality of advertising and providing direct physical contact wildlife 'photo prop' tourism is demonstrated by enforcement action taken by wildlife authorities during our study. We suggest that tourist focused human behavior change initiatives should become a critical component of a wider holistic approach to effectively balance wildlife protection goals and any expansion of wildlife ecotourism in the Amazon.

## Keywords

Animal welfare, *Bradypus variegatus*, Conservation, *Inia geoffrensis*, Sustainability



## Introduction

The Amazon's reputation and ability to draw tourists is thought to be strongly associated with the natural environment and with tourist's ability to have sight of and interact with iconic wild animals (Alves et al. 2011, Tortato and Izzo 2017). Although tourism is only estimated to contribute about one per cent to the Brazilian Amazon region's overall GDP (Filho 2006), given the predicted continued growth of wildlife based tourism globally (UNTWO et al. 2014), studies have drawn attention to the potential of developing forest based ecotourism products. These products are centered not only on the regions unique fauna, but also its natural landscapes, indigenous culture and heritage, particularly in older cities such as Manaus and Belém (e.g. Lohmann and Dredge 2012). These cities are surrounded by the rainforest and act as 'gateways' to wildlife based tourism activities such as river tours and jungle lodges (Unibanco Guides Amazon 2009, Lohmann and Dredge 2012).

In some cases, wildlife-focused ecotourism can be profitable for rural people living in or near wilderness areas because they possess first-hand knowledge of local landscapes and native flora and fauna (Hoefle 2016). For example, working as guides or by providing transportation and accommodation, they can receive payment for environmental services in lieu of previous unsustainable hunting practices (Hoefle 2016). This in turn complements modern wildlife conservation and animal welfare policy which has generally shifted from removing long-resident people from new designated protected areas, and/or penalizing those who practice unsustainable activities in buffer zones, to that of creating sustainable alternative community-based activities with the aim of both promoting forest preservation and alleviating rural poverty (Hoefle 2016).

However, although wildlife ecotourism can and does have net positive impacts on wildlife (Brockington and Duffy 2010), recent research has highlighted that wildlife focused ecotourism can also have net negative impacts on both the conservation and the welfare of wild animals (Moorhouse et al. 2015, 2016). For example, regular close proximity of tourists with free-ranging wildlife can have an adverse impact on an array of animal behaviors such as breeding (Jacobson and Lopez 1994) and foraging (Meissner et al. 2015). Direct physical contact with wild caught wildlife can also lead to the unintentional death of individuals belonging to threatened species. For example, in 2016 media attention focused on a La Plata river dolphin (*Pontoporia blainvillei*) that died after beachgoers in Argentina hauled the dolphin out of the water to pose with the dolphin for photos (National Geographic 2016).

When wildlife focused ecotourism operators decide to place specific emphasis on achieving net positive outcomes for individual wild animals and remaining wild populations, some trade-offs in the values of conservation, animal welfare, visitor satisfaction and profitability may occur (Fernandez et al. 2009). However, the outcomes of these trade-offs, particularly the negative impacts on wild animal conservation and welfare, are difficult to detect, especially by tourists themselves (Moorhouse et al. 2015). Different attitudes and societal expectations can often complicate such decision-making even further (Moorhouse et al. 2016). As can the myriad of different legal situations



involved, which can include absent, ambiguous, inaccessible and or conflicting legislation (TRAFFIC 2008).

Tourism leaders have called for the private and public sectors to develop domestic and international wildlife ecotourism in the Amazon region, yet specific information regarding current practice and impact is lacking (Lohmann and Dredge 2012). To help address this situation, herein we provide a case study review using the Amazon 'gateway' city of Manaus as a geographic area of focus. Specifically, we asked: (1) what types of wildlife ecotourism activities are currently being provided; (2) how prevalent are they; (3) what taxonomic groups are most commonly involved; (4) what is their legal status; and (5) what potential impact are they having on wild animals. We hope the information gathered will help to guide existing efforts to develop wildlife ecotourism in a manner that safeguards animal welfare and conserves wild animal populations.

## **Methods**

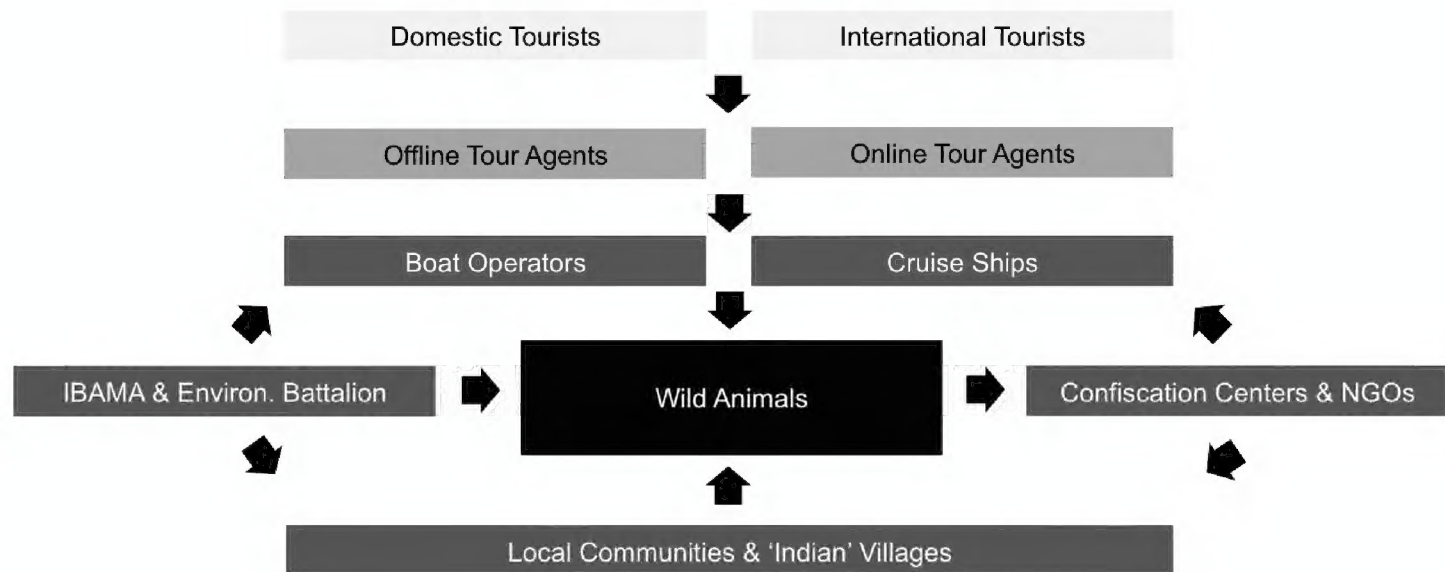
### **Study site**

Amazonas is the largest state of Brazil, with a total area of 1.6 million km<sup>2</sup> (Divino and McAleer 2009). Around 77% of the Amazonas state forest remains intact and includes scenic natural landscapes, that not only serves as habitat for wild fauna but also as an enticing tourist attraction (Divino and McAleer 2009). The capital of Amazonas state is Manaus [estimated population, 2,094,391 (IBGE 2016)], which is at the confluence of the two main tributaries of the Amazon River, where the black water of the Rio Negro and the yellowish-brown water of the Rio Solimoes join to form the Amazon River (Divino and McAleer 2009). Located close to intact Amazonas state forest, Manaus has an airport that can receive full-size jet aircrafts and is connected to wildlife tourist destinations by paved highways and larger riverboats (Divino and McAleer 2009).

### **Operating model**

Tourists typically arrive by air in Manaus, are taxied to the port, and taken by boat to floating hotels or hostels located on the river edge (Figure 1; Hoefle 2016). Wildlife ecotourism excursions can be booked before and after arrival in Manaus, through tour agents that operate indirectly online and directly via local branches (Figure 1). Tour guides and boat operators are employed to accompany tourists on excursions with the size of transport crafts ranging from covered outboard-powered boats up to small cruise ships (Figure 1; Hoefle 2016). Luxury jungle lodges are also located along the Negro River in Iranduba and Novo Airão municipalities, upstream from Manaus (Hoefle 2016). This route has been described as one of the most scenic of the Amazon tributaries with forests that are largely intact and black water that produces 'beautiful reflections' (Hoefle 2016, Lohmann and Dredge 2012).





**Figure 1.** Stakeholder map / operating model.

## Fieldwork

We used online search engines to identify boat tour companies operating from Manaus that specifically advertised wildlife ecotourism. We conducted fieldwork in Manaus between October 4<sup>th</sup> and November 18<sup>th</sup> 2016. We gave each wildlife boat tour a unique identification code noting: the date of the tour; the name of the tour company; the price of the tour [(in Brazilian Reals (BRL))]; the number of other tourists present; and documented the types of wildlife ecotourism activities provided. Whenever opportunities for close and or direct physical contact with wildlife were provided, we recorded the geographic location (via GPS Garmin model GPS-MAP64), species; estimated age class (juvenile or adult); and the number of animals involved. We also recorded whether these types of activities were actively encouraged or discouraged by the official tour guide, taking photographic images and other qualitative observations.

## Legislative review

We identified relevant legislation to fully understand the legal status of any close and or direct contact opportunities observed during our fieldwork via online search engines and consultation with relevant government agencies. This included legislation relating, but not limited, to wildlife management, conservation, national red lists of endangered species, animal welfare, tourism, environmental crime, and jurisprudence. As part of our subsequent review, we included national legislation such as constitutions, laws, decrees, resolutions, and regulations, normative instructions in addition to any international treaties and relevant case studies of legal precedence. Using these sources, following our fieldwork we specifically evaluated three types of activity: (1) baiting of wild animals for tourists (i.e. provision of food to attract); (2) capture (and subsequent captivity) of live animals for tourists; and (3) handling by tourists.



**Table 1.** Information about tours attended during our 2016 fieldwork in Manaus.

Tour ID number	Tour start date	Duration (days)	Price (\$BRL per day)	No. of tourists	Contact provided (yes or no)	Contact encouraged (yes or no)
1	04.10.16	1	200	22	Yes	Yes
2	06.10.16	1	200	50	Yes	Yes
3	08.10.16	1	150	29	Yes	Yes
4	09.10.16	1	200	49	Yes	Yes
5	11.10.16	1	200	61	Yes	Yes
6	13.10.16	1	350	6	Yes	Yes
7	15.10.16	1	200	24	Yes	No
8	16.10.16	1	150	50	Yes	Yes
9	18.10.16	1	220	38	Yes	No
10	20.10.16	1	180	44	Yes	Yes
11	22.10.16	1	200	52	Yes	Yes
12	23.10.16	1	260	13	Yes	No
13	24.10.16	1	150	24	No	N/A
14	27.10.16	1	200	54	Yes	Yes
15	29.10.16	1	180	14	Yes	Yes
16	03.11.16	3	250	5	Yes	Yes
17	06.11.16	1	350	4	Yes	Yes
Total	–	19	–	515	–	–

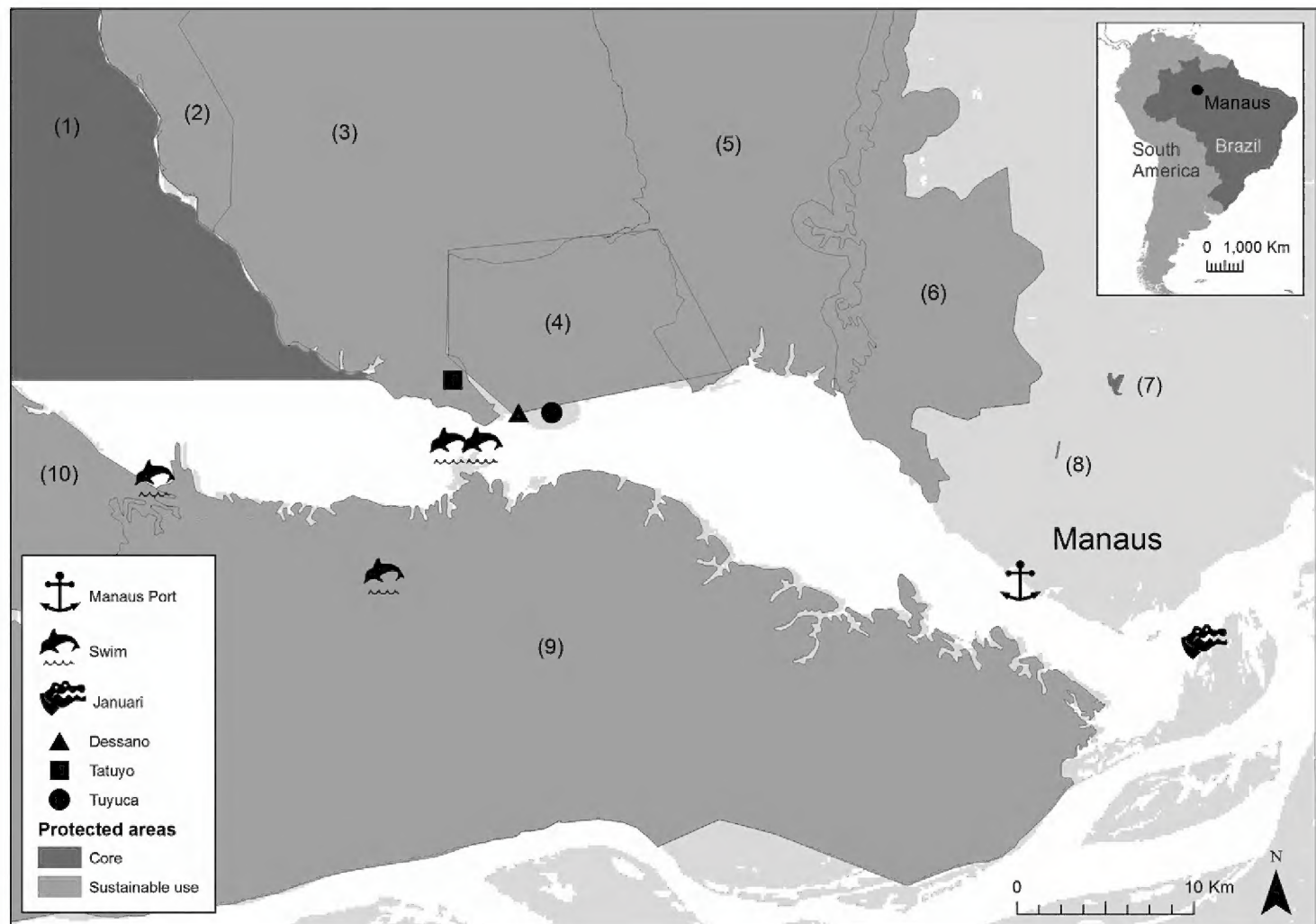
## Results

Fieldwork involved active participation on 17 different wildlife boat excursions provided by 17 different tour agencies. Excursion duration ranged between 1 to 3 days, prices ranged from 150 to 350 BRL (approximately 48 to 112 \$ USD per day), and tourist attendance ranged between six and 61 individuals (Table 1). The opportunity for direct contact with live wild animals (i.e. to touch baited free-ranging or handle captive individuals) was provided to tourists on 94% (n = 16) of excursions at six different locations (Table 1, Figure 2). Official tour guides were observed actively encouraging these types of tourist activity during 77% of excursions. The opportunity to touch free ranging baited pink river dolphins [*Inia geoffrensis* (2–10 individual animals; on 82% tours)] was most commonly provided, followed by the opportunity to handle captive brown-throated three-toed sloths [*Bradypus variegatus* (2–4 animals; on 71% tours)], to handle captive common caiman [*Caiman crocodilus crocodilus* (1-2 animals; on 71% tours)], to handle captive green anaconda [*Eunectes murinus* (1-2 animals; on 65% tours)] and to touch free-ranging baited squirrel monkeys [*Saimiri sciureus sciureus* (> 50 animals; on 6% tours)] (Table 1, Figure 3).

## Wildlife baiting

We observed four aggregations of free-ranging pink river dolphins that have been conditioned to human contact through provisioning of fish (Figure 4). Tourists were able to feed, touch, and swim with these animals with access provided via four floating





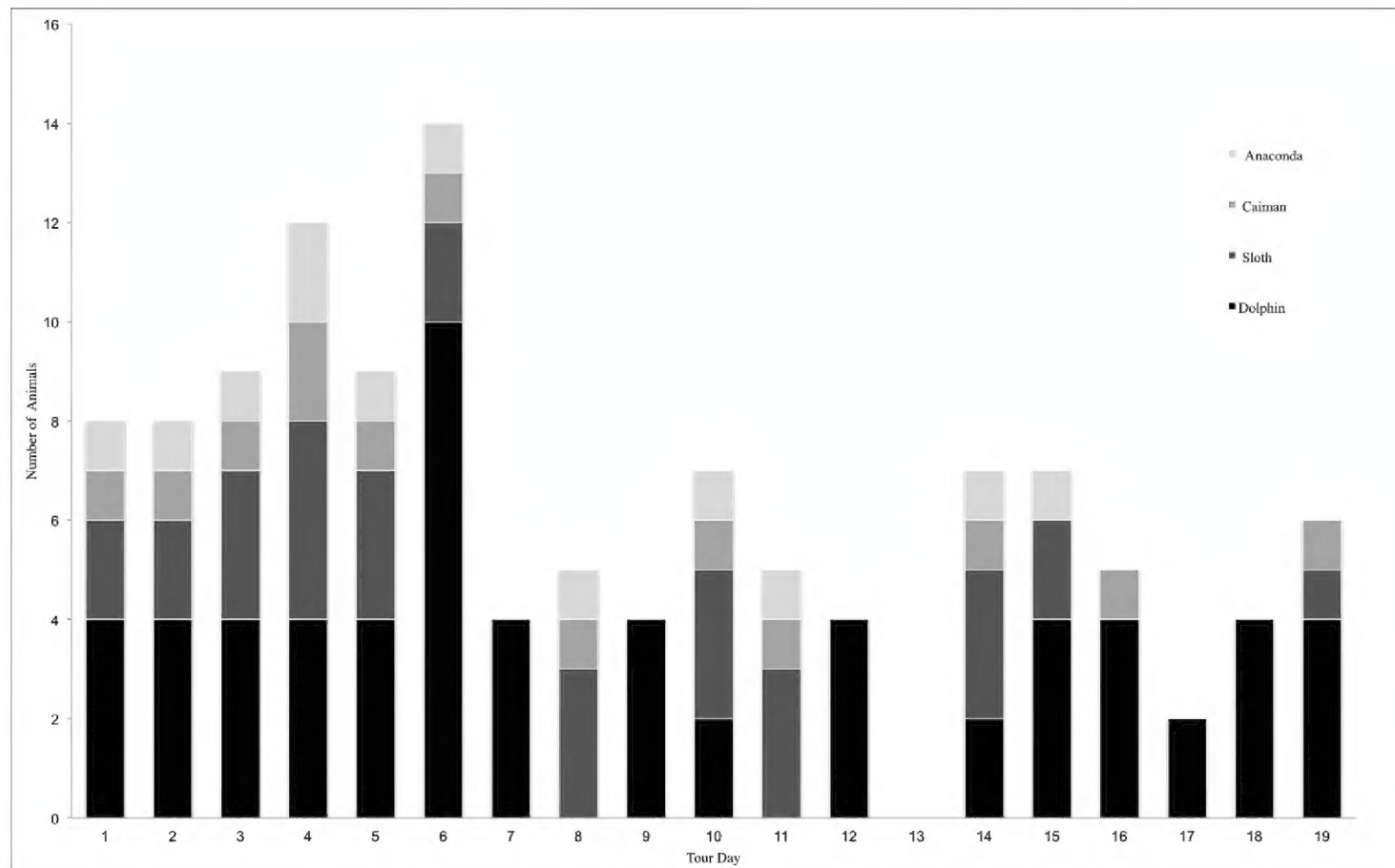
**Figure 2.** Map of key boat tour locations. Protected area names are numbered as followed **1** PN (Parque Nacional) de Anavilhanas **2** APA (Área de Proteção Ambiental) Margem Esquerdo Rio Negro Setor Aturiá\_Apuauzinho **3** RDS (Reserva de Desenvolvimento Sustentável) Puranga Conquista **4** RDS Tupé **5** APA Margem Esquerdo Rio Negro Setor Tarumã Açú-Tarumã Mirima **6** APA Taruma/Ponta Negra **7** PE (Parque Estadual) Sumaúma **8** APA Parque Linear do Bindá **9** APA Margem Direito Rio Negro Setor Paduari-Solimões **10** RDS Rio Negro. Map was made in ArcMap 10.2.2 using publicly available data from the Ministry of Environment (Available at <http://mapas.mma.gov.br/i3geo/datadownload.htm>).

structures (Figure 2). During all dolphin interactions, we observed local staff baiting dolphins so that they could hold them in position out of the water for tourist photo opportunities; (Figure 4). On two of these floating structures we observed tourists feeding adult pirarucu (*Arapaima gigas*) with fish tied to the end of bamboo poles. We also observed one troop of squirrel monkeys that had been conditioned to human contact through provisioning of food so that tourists could feed, touch and have photo opportunities with these animals.

### Wildlife photo props

We observed captive live animals being made available for handling by tourists, particularly for use as photo props, on and around three floating structures that serve as debarkation points for access to an unprotected area of forest known locally as 'Januari Ecological Park' (Figure 2). Here, we observed two adult captive green anacondas in





**Figure 3.** Number of animals provided for direct contact per tour.

general poor body condition showing specific signs of dehydration and bearing wounds indicating prior physical trauma. During all excursions, we observed handlers restraining the snakes by tightly gripping their neck whilst they were either touched or held by tourists (Figure 4). Both captive common caiman ( $n = 2$ ) observed during excursions were restrained using a rubber band around their jaws (Figure 4); with one animal kept in a small broken fridge when not being handled by tourists. Similarly, we observed a total of 9 individual captive brown-throated three-toed sloths (2 adult and 7 juveniles) two of which were tied to a tree with rope when not being handled by tourists.

### Wildlife souvenirs

Although not a primary focus of our study, we also observed several different wildlife based products being sold as souvenirs to visiting tourists during these boat tours. Key points of sale include craft markets located at access points to Januari Ecological Park, on floating restaurants, and floating platforms used for pink river dolphin interactions (Figure 5). Three craft markets are operated by individuals belonging to Tatuyo, Tuyuca and Dessano tribes, typically visited by tourists before and after performances and photo opportunities involving individuals wearing traditional dress (Figure 2). We observed preserved fish [including catfish (e.g. *Pterygoplichthys anisitsi*) and piranha (*Serrasalmus* spp.) being commonly sold as ornaments at these craft stalls. On one occasion, we also observed a pink river dolphin, two common caiman skulls and an ocelot (*Leopardus pardalis*) skull on sale at a Tuyuca craft stall (Figure 5).





**Figure 4.** Example images of species provided to tourists for photo prop opportunities when visiting Manaus, Brazil. **A** Common caiman (*Caiman crocodilus crocodilus*) **B** Brown-throated three-toed sloth (*Bradypus variegatus*) **C** Green anaconda (*Eunectes murinus*); and **D** Pink river dolphin (*Inia geoffrensis*). Image by: Neil D'Cruze / World Animal Protection.

### Relevant legislation

We found no specific laws regulating the baiting of free-ranging wildlife in Brazil. However, national legislation relating to environmental crimes [Federal Law 9,605/1998 (Appendix II)] states that it is illegal to pursue, capture, or kill any specimen of wild fauna in Brazil without due permit, license or authorisation from a competent authority (Suppl. material 1). Additionally, The Hunting Act [Federal Law 5,197 (Appendix II)] also strictly forbids any such activity ‘involving wildlife living naturally outside of captivity’ which are deemed property of the State (Suppl. material 1). Designated





**Figure 5.** Example images of wildlife products available for purchase by tourists when visiting Manaus, Brazil. **A** Pink river dolphin (*Inia geoffrensis*) and ocelot (*Leopardus pardalis*) skull **B** Floating Structure **C** Catfish (*Liposarcus anisitsi*); and **D** Common caiman skull (*Caiman crocodilus crocodilus*). Image by: Neil D'Cruze / World Animal Protection.

finer per specimen are 500 BRL (150 USD), however, this can reach up to 5,000 BRL (1,500 USD) per specimen if they are included on the Brazilian list of endangered species [Federal Decree 6,514 (Appendix II)] (Suppl. material 1). With regards to the species observed during our study, only the pink river dolphin is currently included on the Brazilian list of Threatened species; where the species is classified as 'Endangered' [Federal Law 6,938 (Appendix II)] (Suppl. material 1).

However, there are a few notable exceptions. For example, a Normative Ruling [(IBAMA 26/2002 (Appendix II)] establishes rules for the sustainable use (capture



and killing) of non-endangered indigenous Brazilian wildlife conventionally used by 'traditional populations' in a minority of 'Nature Conservation Units' specifically designated as 'Extractive Reserves' (a type of 'sustainable-use' protected area, Figure 2) (Suppl. material 1). The Hunting Act also enables the federal government to issue species-specific time-bound permits for such activity where 'regional peculiarities accommodate hunting activities' [Federal Law 5,197 (Appendix II)] (Suppl. material 1). Additionally, another normative ruling (IBAMA 07/2015) permits the private ownership and commercial use of certain species, provided that the wild animals have been bred in captivity and their owners can provide adequate proof of origin to the relevant authorities (Suppl. material 1). Another ruling [394/2007 (Appendix II)] aims to establish the criteria needed to determine the wild species that can be utilised in this manner (Suppl. material 1).

It is worth noting that none of the tour boat destinations visited during our study were in the 'Extractive Reserves' mentioned above. The destinations were surrounded by protected areas of stricter sustainable-use categories (areas numbered 2–10, Figure 2) and several were located within 10km of one 'core' or fully protected area, the most stringent class of 'Nature Conservation Units' (Proteção Integral, 1, Parque Nacional de Anavilhanas, Figure 2).

## Discussion

Although wildlife ecotourism at key sites in the Amazon remains relatively underdeveloped (Lohmann and Dredge 2012), our study demonstrates that a wide variety of activities are already being promoted and provided to domestic and international tourists who visit via the city of Manaus. Specific activities involving direct physical contact with wild animals include wildlife baiting, swimming with free-ranging pink river dolphins, and the handling of captive wild animals as photo props that are available throughout the year irrespective of season. These activities involve a range of different wild animals, representing at least 10 different species from three different taxonomic classes (fish, mammals and reptiles). Although tourism leaders are increasingly calling for increased investment, with several studies citing wildlife eco-tourism in Manaus as an exemplary model (e.g. Lohmann and Dredge 2012, Hoefle 2016), to date none have provided a detailed review of the associated conservation, animal welfare and legal implications.

## Conservation implications

The majority of species that we observed being used for wildlife ecotourism activities in Manaus are not currently considered to be of high conservation status, from either an international or a national perspective. None are currently considered as Threatened according to the IUCN Red List (IUCN 2017) and only the pink river dolphin is cur-



rently listed (as Endangered) on the Brazilian Red List of Threatened Species (Portaria No 444, 2014). However, it is important to note that internationally the pink river dolphin is currently considered as Data Deficient, the green anaconda has not yet been assessed, and it is acknowledged that existing common caiman assessment requires updating for the IUCN Red List (IUCN 2017). As such, at least from a local population perspective, the conservation impact of this emerging commercial activity on these species should not be completely disregarded as their use may already be or could become a potential threat to the survival of wild populations in future.

The unregulated killing of wild animals and subsequent sale of their body parts as tourist souvenirs (e.g. pink river dolphin skulls) is of potential concern in terms of its sustainability and negative conservation impact. However, photo prop tourism in Manaus also appears to involve the repeated long-term removal of individual animals from wild populations and associated mortalities. Taking the use of brown-throated three-toed sloths as a case in point; a total of six sloths were observed being used in this manner during our main fieldwork, however none of these same animals were observed just five months later during a brief reconnaissance in April 2017. Although it was not possible for us to specifically determine the fate of these animals, mortalities are a distinct possibility given the relatively low reported survival rate of this species at rescue and rehabilitation facilities (Moreno and Plese 2006) and the technical challenges associated with successful wild release (IUCN 2017).

### **Animal welfare implications**

From an animal welfare perspective, the handling and use of captive wild animals as 'photo props' has become a particularly controversial tourism activity (Idfwru 2013). Prior research has already highlighted how this type of practice can severely compromise the physiological and psychological well-being of wild animals during capture, restraint and subsequent use (e.g. Baker et al. 2013). Our field observations also support existing concerns regarding how such repeated handling, combined with poor husbandry, exposure to continual flash photography, and unnatural surroundings could lead to stress, disease, injury and associated mortalities (Idfwru 2013). For example, given the observed frequency of use and key traits of their natural history [e.g. cryptic, arboreal behavior and relatively low metabolic rate (Fowler and Cubas 2001, Munaó Diniz and Oilveria 1999)] the use of brown-throated three-toed sloths for this type of tourism is perhaps of particular concern.

Although it involves free-ranging individuals, human baiting and associated direct contact (e.g. touching) with wildlife such as dolphins and primates has also become a controversial tourist activity (Orams 2002, Moorhouse et al. 2015). Despite the economic benefits, the baiting of pink river dolphins has already been identified as being of potential animal welfare concern (Alves et al. 2011). Escalation of pink river dolphin behavior from habituation to increased confidence, assertiveness, 'pushiness' and potential eventual aggression, towards conspecifics has been observed during previous



studies (Alves et al. 2011). Similarly, cases of potentially harmful human behaviour have also been observed (for example, attempting to restrain or ride the dolphins, striking the dolphins and feeding inappropriate objects) (Alves et al. 2011). Consequently, because of poor management, such activity could result in net negative impacts on the welfare of the animals involved (Alves et al. 2011).

## Legal implications

Despite the potential risks imposed to dolphins, there are no specific laws regulating baiting, touching and swimming with wild pink river dolphins in Brazil (Alves et al. 2011). In fact, the official tourism website for Brazil actively promotes such wildlife ecotourism activity; citing that it generates income and encourages cetacean protection amongst fishermen in the region (Visit Brazil 2017). However, Federal decree number 6514 article 30 states that the intentional disturbance of any species of cetacean in Brazilian waters is forbidden with lawbreakers subjected to fines. Also, more broadly speaking, while no specific legislation prohibits wildlife baiting within Brazilian conservation units, this type of activity is prohibited by the internal regulations of some national parks [e.g., Serra dos Órgãos National Park (IBAMA 2010)]. In these cases, those who ignore these regulations may be subject to fines. When taking this legislation into account, the pink river dolphin tourism activities observed in Manaus could be interpreted as legal infringements (Alves et al. 2011).

In contrast, the illegality of advertising and providing captive wildlife for handling and associated 'photo prop' tourism in Manaus is demonstrated by 'Operação Teia', an enforcement action taken during the course of our study. In November 2016, following complaints against tour operators and evidence obtained from social media platforms, intelligence agents from the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) and police from the Environmental Battalion, issued six tourism companies fines totalling \$R 1.3 million ( $\approx$  425,000 \$USD) using Federal Law 9,605 and Federal Decree 6,514. As part of this operation the authorities confiscated six captive wild animals from January Ecological Park, directly returning five of them to the wild [two green anaconda, two common caiman and one boa constrictor (*Boa constrictor*)]. A juvenile sloth was also forwarded to IBAMA's Centre for wild animals [(Centro de Triagem de Animais Silvestres (CETAS)] for rehabilitation (Acritica 2016, IBAMA 2017). But, despite this enforcement operation we observed photo-prop tourism, using these same species, at this same location five months later during a reconnaissance visit in April 2017.

## Recommendations

Our fieldwork was limited to a select number of tours in Manaus, during two months of one dry season in 2016, and a brief reconnaissance in 2017. Therefore, this repre-



sents only a momentary glimpse into a complex and varied industry. It is reasonable to assume that additional wildlife-focused ecotourism activities, involving a wider range of wild animal species, at additional geographical locations, are currently being offered that went unobserved by us. Standards and practices will inevitably vary between tour operators, and our research methods restricted our ability to make a full and detailed assessment of the impacts on individual animals and species. However, our study provides an important initial insight into wildlife-focused ecotourism in Manaus that can serve as the foundation for further research. Based on our field observations and concerns already raised in the existing literature, we suggest that longer and more detailed animal welfare and conservation impact assessments of species-specific activities (such as pink river dolphin swims and brown-throated three-toed sloth photo-prop tourism) are required. Increased information on how wild animals are being sourced, kept and disposed would prove particularly useful.

Our study also highlights existing legislation relating to wildlife ecotourism can be ambiguous, inaccessible and/or conflicting (TRAFFIC 2008). For example, the legal status of wildlife ecotourism activities in Brazil can vary, depending on how a wild animal is sourced, how they are used, who is using them, and where (Table 1). Increased clarity regarding the legal status of baiting pink river dolphins with food for close interactions is particularly needed to help regulate and mitigate any negative impacts both on these Endangered cetaceans. Although there is more clarity regarding the illegal status of captive wildlife handling and 'photo-prop' tourism in Manaus, it is apparent from on-going activity, post Operação Teia, that enforcement action alone will not be enough to halt this illegal use of wildlife. Rather, a wider and more holistic approach that includes education and human behaviour change focused initiatives targeting both local communities, operators and in particular, tourists is required to prevent potential negative impacts from inevitable ecotourism expansion in the Amazon.

Increased research focused on the attitudes of tourists is required to inform the development of effective public awareness initiatives aimed at reducing demand for harmful wildlife ecotourism both in Manaus and elsewhere in the Amazon region. In the absence of global regulatory authorities, and given their wide global audience (e.g. TripAdvisor, 2016), the dissemination of relevant information via international online travel websites could also prove highly impactful in achieving positive human behaviour change in this regard (Moorhouse et al. 2016). On a national level, Brazil already has a National Tourism Plan [Plano Nacional do Turismo, 2013 (Federal Decree 7,994/2013)]. However, we note that neither the current plan nor its associated guidelines (Ministério do Turismo, 2016) appear to contain any specific guidance regarding the proper regulation of wildlife ecotourism in Brazil. Given that the National Tourism Plan is revised every four years, we recommend that such information should be included in future plans to help balance and manage growing tourist interest in wildlife ecotourism and wider wildlife protection goals.



## Conclusion

Wildlife tourism can and does have positive impacts on wildlife (Brockington and Duffy 2010), but can also have neutral and negative impacts (Higginbottom 2004, Moorhouse et al. 2015). In the absence of global regulatory authorities (Moorhouse et al. 2016), independent ground-level audits, using direct observations and interviews with staff focused on welfare and conservation aspects (e.g. Alves 2011, Arena et al. 2012, Schmidt-Burbach et al. 2015, Carder et al. 2016) like this study can provide important insights to help reduce the prevalence of ecotourism activities with negative impacts and increase those with positive impacts on wildlife. Arguably, this task is set to become more urgent and challenging in the future; globally wildlife tourism is growing because of increasing disposable incomes, improved accessibility for urban citizens and greater publicity for, and generation of public interest in, wild places and species (Karanth 2012).

## Acknowledgements

We thank Jan Schmidt-Burbach and Cassandra Koenen for their invaluable comments and insights during this research project. Many thanks to the Investigation and Evidence team at World Animal Protection, and other anonymous contributors, who provided confidential information in support of this research. Special thanks go to Kate Nustedt for supporting this project. This research project was fully funded by World Animal Protection.

## References

- Acritica (2016) Operação Teia, do Ibama, multa empresa do Miss Brasil por uso de animais em video. <http://www.acritica.com/channels/governo/news/operacao-teia-do-ibama-multa-empresa-do-miss-brasil-por-uso-de-animais-em-video>
- Alves LCPS, Andriolo A, Orams MB, Azevedo AF (2011) The growth of “botos feeding tourism”, a new tourism industry based on the boto (Amazon river dolphin) *Inia geoffrensis* in the Amazonas State, Brazil. *Sitientibus Série Ciências Biológicas* 11(1): 8–15. <https://doi.org/10.13102/scb140>
- Arena PC, Warwick C, Steedman C (2014) Welfare and Environmental Implications of Farmed Sea Turtles. *Journal of Agricultural and Environmental Ethics* 27: 309–333: <https://doi.org/10.1007/s10806-013-9465-8>
- Brockington D, Duffy R (2010) Capitalism and conservation: the production and reproduction of biodiversity conservation. *Antipode* 42(3): 469–484: <https://doi.org/10.1111/j.1467-8330.2010.00760>
- Carder G, Proctor H, Schmidt-Burbach J, D'Cruze (2016) The animal welfare implications of civet coffee tourism in Bali. *Animal Welfare* 25(2): 199–205: <https://doi.org/10.7120/09627286.25.2.199>
- de Stefani Munaó Diniz L, Oliveira PM (1999) Clinical problems of sloths (*Bradypus* sp. and *Choloepus* sp.) in captivity. *Journal of Zoo and Wildlife Medicine* 76–80.



- Divino JA, McAleer M (2009) Modelling sustainable international tourism demand to the Brazilian Amazon. *Environmental Modelling and Software* 24(12): 1411–1419. <https://doi.org/10.1016/j.envsoft.2009.06.010>
- Fernandez EJ, Tamborski MA, Pickens SR, Timberlake W (2009) Animal–visitor interactions in the modern zoo: Conflicts and interventions. *Applied Animal Behaviour Science* 120(1): 1. <https://doi.org/10.1016/j.applanim.2009.06.002>
- Filho JM (2006) Livro de Ouro da Amazonia. Ediouro, Rio de Janeiro.
- Fowler ME, Cubas ZS (2001) Biology, medicine, and surgery of South American wild animals (547). Iowa State University Press, Ames. <https://doi.org/10.1002/9780470376980>
- Higginbottom K (2004) Wildlife tourism: an introduction. Wildlife tourism: impacts, management and planning. Common Ground Publishing Pty Ltd., Altona Vic, Australia, 1–11.
- Hoefle SW (2016) Multi-functionality, juxtaposition and conflict in the Central Amazon: Will tourism contribute to rural livelihoods and save the rainforest? *Journal of Rural Studies* 44 24–36. <https://doi.org/10.1016/j.jrurstud.2015.12.009>
- Idfwru F, Wkh WR, Wdeoh SUR (2013) Traffic Bulletin 27 (1) Slow lorries as photo props in Thailand.
- IBAMA (2017) Ibama multa empresas de turismo no Amazonas por exploração ilegal de animais silvestres. [http://www.ibama.gov.br/index.php?option=com\\_content&view=article&id=518:ibama-multa-empresas-de-turismo-no-amazonas-por-exploracao-ilegal-de-animais-silvestres&catid=58&Itemid=271](http://www.ibama.gov.br/index.php?option=com_content&view=article&id=518:ibama-multa-empresas-de-turismo-no-amazonas-por-exploracao-ilegal-de-animais-silvestres&catid=58&Itemid=271)
- IBAMA (2010) Ciência e Conservação na Serra dos Órgãos. <http://www.ibama.gov.br/sophia/cnia/livros/cienciaeconservacaonaserradosogaosdigital.pdf>
- IUCN (2017) IUCN Red List of Threatened Species. <http://www.iucnredlist.org>
- Jacobson SK, Lopez AF (1994) Biological impacts of ecotourism: tourists and nesting turtles in Tortuguero National Park, Costa Rica. *Wildlife Society Bulletin* (1973–2006) 22(3): 414–419.
- Karanth KK, DeFries R, Srivathsa, Sankaraman V (2012) Wildlife tourists in India's emerging economy: potential for a conservation constituency? *Oryx* 46(3) 382–390: <https://doi.org/10.1017/S003060531100086X>
- Lohmann G, Dredge D (Eds.) (2012) *Tourism in Brazil*. Taylor & Francis.
- Meissner AM, Christiansen F, Martinez E, Pawley MD, Orams MB, Stockin KA (2015) Behavioural effects of tourism on oceanic common dolphins, *Delphinus* sp., in New Zealand: The effects of markov analysis variations and current tour operator compliance with regulations. *PloS ONE* 10(1). <https://doi.org/10.1371/journal.pone.0116962>
- Ministério do Turismo (2013) Plano Nacional do Turismo. [http://www.turismo.gov.br/images/pdf/plano\\_nacional\\_2013.pdf](http://www.turismo.gov.br/images/pdf/plano_nacional_2013.pdf)
- Ministério do Turismo (2016) Turismo e Sustentabilidade. [http://www.turismo.gov.br/images/pdf/06\\_06\\_2016\\_mtur\\_guia\\_turismo\\_sustentabilidade.pdf](http://www.turismo.gov.br/images/pdf/06_06_2016_mtur_guia_turismo_sustentabilidade.pdf)
- Moorhouse TP, Dahlsjö CA, Baker SE, D'Cruze NC, Macdonald DW (2015) The customer isn't always right—conservation and animal welfare implications of the increasing demand for wildlife tourism. *PloS ONE* 10(10). <https://doi.org/10.1371/journal.pone.0138939>
- Moorhouse T, D'Cruze NC, Macdonald DW (2016) Unethical use of wildlife in tourism: what's the problem, who is responsible, and what can be done? *Journal of Sustainable Tourism* 25(4): 505–516: <https://doi.org/10.1080/09669582.2016.1223087>



- Moreno S, Plese T (2006) The illegal traffic in sloths and threats to their survival in Colombia. *Edentata*, 10–18. <https://doi.org/10.1896/1413-4411.7.1.10>
- Orams MB (2002) Feeding wildlife as a tourism attraction: a review of issues and impacts. *Tourism management* 23(3): 281–293. [https://doi.org/10.1016/S0261-5177\(01\)00080-2](https://doi.org/10.1016/S0261-5177(01)00080-2)
- National Geographic (2016) The Dark Side of Trendy Animal Photos. <http://news.national-geographic.com/2016/02/160222-exotic-pets-wildlife-pets-nature-animals>
- Schmidt-Burbach J, Ronfot D, Srisangiam R (2015) Asian elephant (*Elephas maximus*), pig-tailed macaque (*Macaca nemestrina*) and tiger (*Panthera tigris*) populations at tourism venues in Thailand and aspects of their welfare. *PloS ONE* 10(9). <https://doi.org/10.1371/journal.pone.0139092>
- Tortato FR, Izzo TJ (2017) Advances and barriers to the development of jaguar-tourism in the Brazilian Pantanal. *Perspectives in Ecology and Conservation* 15(1): 61–63: <https://doi.org/10.1016/j.pecon.2017.02.003>
- TRAFFIC (2008) What's driving the wildlife trade? A review of expert opinion on economic and social drivers of the wildlife trade and trade control efforts in Cambodia, Indonesia, Lao PDR and Vietnam. East Asia and Pacific region sustainable development discussion papers. The World Bank, 103 pp.
- TripAdvisor (2016) Media Centre. [http://www.tripadvisor.co.uk/PressCenter-c4-Fact\\_Sheet.html](http://www.tripadvisor.co.uk/PressCenter-c4-Fact_Sheet.html)
- Unibanco Guides Amazon (2009) Amazon Guide. Bei Comunicado, Sao Paulo.
- Visit Brazil (2007) Explosão de fofura: nadando com golfinhos do Amazonas. <http://www.visitbrasil.com/blog/explosao-de-fofura-nadando-com-golfinhos-do-amazonas/>
- World Tourism Organisation (UNWTO) UNWTO Tourism Highlights (2014) <http://mkt.unwto.org/publication/unwto-tourism-highlights-2014-edition>

## Supplementary material I

### Relevant Legislation

Authors: Neil D'Cruze, Fernando Carniel Machado, Neil Matthews, Margaret Balaskas, Gemma Carder, Vanessa Richardson, Roberto Vieto

Data type: Table

Explanation note: Relevant legislation regarding the legal status of any close and or direct contact opportunities with wildlife observed during our fieldwork. This included legislation relating, but not limited, to wildlife management, conservation, national red lists of endangered species, animal welfare, tourism, environmental crime, and jurisprudence.

Copyright notice: This dataset is made available under the Open Database License (<http://opendatacommons.org/licenses/odbl/1.0/>). The Open Database License (ODbL) is a license agreement intended to allow users to freely share, modify, and use this Dataset while maintaining this same freedom for others, provided that the original source and author(s) are credited.

Link: <https://doi.org/10.3897/natureconservation.22.17369.suppl1>